W F CAWSON

Surge Impedance of Pole Ground Lead - from General Electric Review Vol. 37 Page 185 (where ground plane depth is zero)

$$Z_t = 138.2 \log_{10} \frac{h}{r} + 90 \frac{r}{h} - 60 \text{ ohms.}$$

where h = height of tower above ground line
r = mean equivalent radius of tower (or ground lead)
(r & h must be in same units)

For pole height of 35 ft and using #4 wire ($r = 0.127$")

$$Z_t = \left(138.2 \times \log_{10} \frac{35 \times 12}{.127}\right) + \left(90 \frac{.127}{35 \times 12}\right) - 60 \text{ ohms.}$$

$$= (138.2 \times 3.552) + (\text{—}) - 60 \text{ ohms}$$

$$= 496 - 60. = \underline{\underline{436 \text{ ohms.}}}$$

For pole height of 50 ft and using #4 wire ($r = 0.127$")

$$Z_t = \left(138.2 \times \log_{10} \frac{50 \times 12}{.127}\right) + \left(90 \frac{.127}{50 \times 12}\right) - 60 \text{ ohms.}$$

$$= (138 \times 3.67435) + .02 - 60$$

$$= 507 - 60 = 447 \text{ ohms.}$$

For pole height of 50 ft and using # 2 wire ($r = 0.16$")

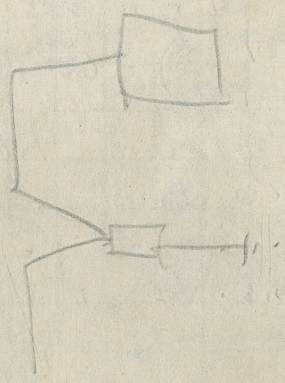
$$Z_t = \left(138.2 \times \log_{10} \frac{50 \times 12}{.160}\right) + 90\left(\frac{.160}{50 \times 12}\right) - 60 \text{ ohms.}$$

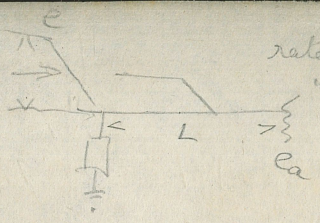
$$= (138.2 \times 3.574) - 60$$

$$= 430.5$$

Prot Tube producing zero voltage better than L.A.

Mutual Impedance





rate of rise of wave on line $\frac{de}{dt}$

" " " " " at tre $2\frac{de}{dt}$.

$\frac{.88\,0000}{2\times 000000}$

Ex.

$v = 1000'/\mu s$

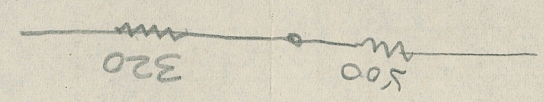
$\frac{de}{dt} = 200\ Kv/\mu s$

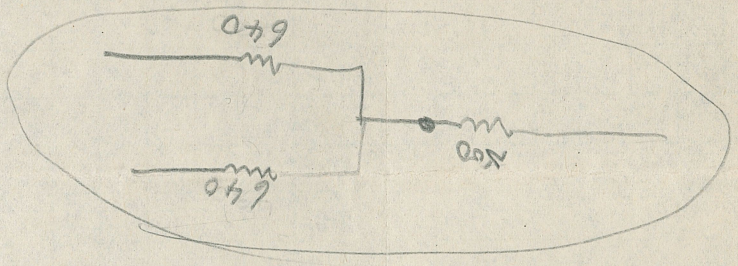
$L = 400'$

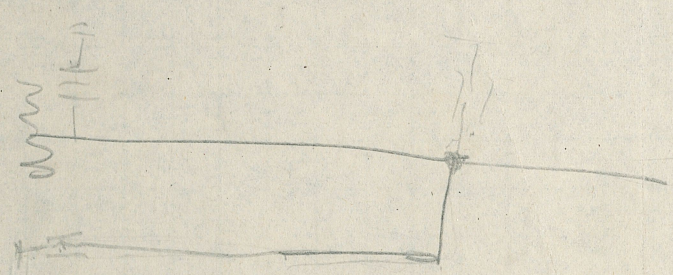
$E_a = 600\ Kv$

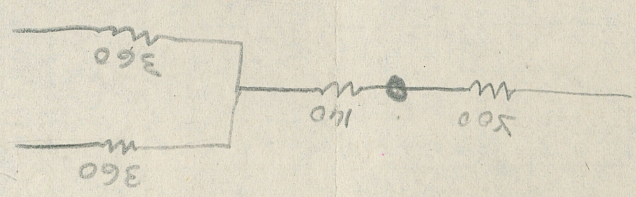
LA discharges at 600 Kv @ 3 μs.

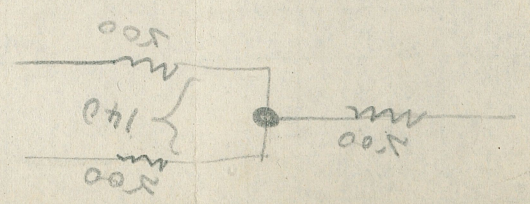
Chopped wave front = 3 μs

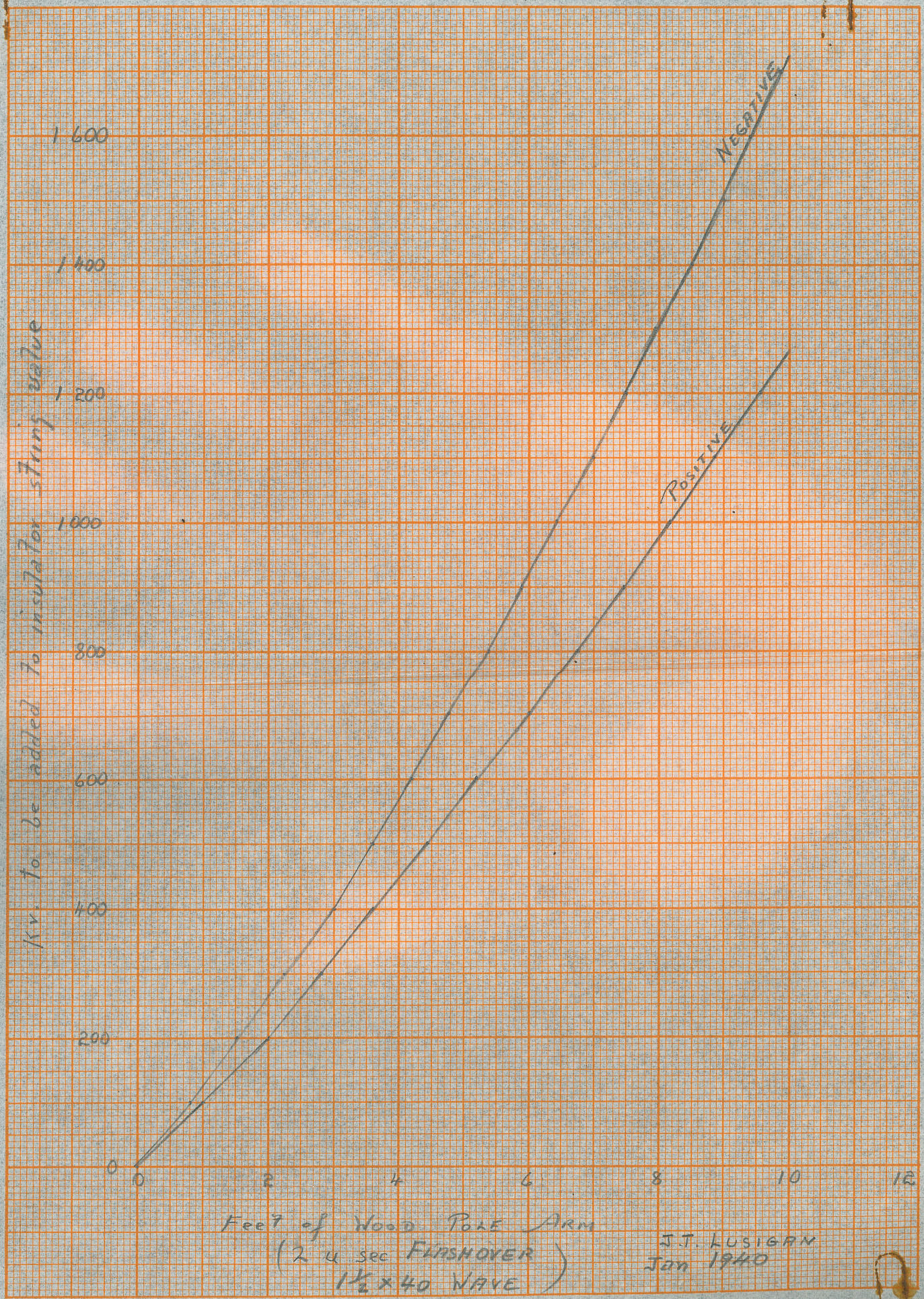












PRINTED IN U.S.A.
EUGENE DIETZGEN CO. NO. 346